

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1-29. (Canceled).

30. (Currently Amended) A spray nozzle for a mouth rinse, the spray nozzle comprising:

a nozzle member;

a nozzle attachment coupled to the nozzle member to define an axially extending chamber;

a liquid duct configured to supply pressurized liquid to the chamber;

a pressure piece disposed within the chamber; [[and]]

a nozzle outlet extending out of the chamber and configured to discharge a cleaning jet;

and

one or more spring elements that urge the pressure piece towards the nozzle outlet.

31. (Previously Presented) The spray nozzle of claim 30 wherein first and second ends of the pressure piece comprises cup-shaped portions.

32. (Previously Presented) The spray nozzle of claim 31 wherein the second end of the pressure piece comprises slits extending axially to provide fluid communication between the liquid duct and the chamber.

33. (Previously Presented) The spray nozzle of claim 32 wherein the nozzle member further comprises a nozzle plate configured to engage the first end of the pressure piece to define a whirl chamber.

34. (Previously Presented) The spray nozzle of claim 33 wherein the first end of the pressure piece comprises grooves extending axially and the nozzle member comprises a circumferential ring configured adjacent to the grooves of the pressure piece to define ducts for fluid communication between the chamber and the whirl chamber.

35. (Previously Presented) The spray nozzle of claim 33 wherein the nozzle plate comprises the nozzle outlet.

36. (Canceled)

37. (Currently Amended) The mouth rinse spray nozzle of claim 30 wherein the nozzle outlet is sized and configured such that a velocity of the cleaning jet is at least about 23 m/s.

38. (Currently Amended) The mouth rinse spray nozzle of claim 30 wherein the nozzle outlet is sized and configured such that the liquid jet is a diverging hollow cone jet.

39. (Currently Amended) The mouth rinse spray nozzle of claim 30 wherein the liquid duct is sized and configured to supply supplies pressurized liquid to the chamber at a pressure of at least 15 bar.

40. (Currently Amended) The mouth rinse spray nozzle of claim [[30]]82 wherein the liquid duct is sized and configured to supply supplies pressurized liquid to the chamber at a pressure between about 25 bar and 55 bar.

41. (Currently Amended) The mouth rinse-spray nozzle of claim [[30]]82 wherein the liquid duct is sized and configured to supply supplies pressurized liquid to the chamber at a pressure between about 35 bar and 45 bar.

42-46. (Canceled)

47. . (Withdrawn) A dental cleaning system comprising:
the spray nozzle of claim 30;
a hand piece to support the spray nozzle;
a pump adapted to be driven by an electric motor and disposed within the hand piece and connected to the liquid duct by a delivery tube; and
a storage reservoir in fluid communication with the liquid duct.

48. (Withdrawn) The system of claim 47 wherein the spray nozzle is detachably connected to the hand piece, the hand piece being configured to receive a plurality of spray nozzles.

49. (Withdrawn) The system of claim 48 wherein the pump is switchable between multiple modes of operation depending upon the spray nozzle connected to the hand piece.

50. (Withdrawn) The system of claim 48 further comprising:
a sensor to detect an operating parameter of the motor; and
a control unit configured to receive the operating parameter detected by the sensor;
wherein the electric motor is controllable by the control unit as a function of an operating mode assigned to the detected operating parameter.

51. (Withdrawn) The system of claim 50 further comprising at least two operating modes, including a high-pressure mode for the removal of dental plaque and a reduced-pressure mode for an oral rinse.

52. (Withdrawn) The system of claim 50 wherein the operating parameter comprises rotational speed.

53. (Withdrawn) The system of claim 50 wherein the operating parameter comprises torque.

54. (Withdrawn) The system of claim 50 further comprising a pressure sensor disposed between the pump and the spray nozzle for detecting the pressure of the cleaning liquid fed to the spray nozzle, wherein the control unit is configured to receive a signal indicative of the detected pressure from the pressure sensor and the electric motor is controllable by the control unit as a function of the operating mode assigned to the detected pressure.

55. (Withdrawn) The system of claim 47 further comprising a crank mechanism, the crank mechanism comprising:

a drive device;

a drive element adapted to be driven for rotation about an axis of rotation by the drive device; and

an eccentric shaft adjustably arranged on the drive element a total eccentric dimension away from and parallel to the axis of rotation.

56. (Withdrawn) The system of claim 55 wherein the drive element is adapted to be driven for rotation in reversible manner and the eccentric shaft is arranged on an output element which is arranged on the drive element so as to be freely pivotal between a first and a second end

position about a pivot axis arranged a first eccentricity away from and parallel to the axis of rotation.

57. (Withdrawn) The system of claim 56 wherein the output element comprises a disk that is mounted on the drive element so as to be pivotal about the pivot axis, the disk carries a crankpin that extends with a second eccentricity parallel to the axis of rotation, and the drive element comprises an axially projecting driver that is pivotal with the drive element and projects between two stops defining the two end positions along the disk.

58. (Withdrawn) The system of claim 57 wherein the second eccentricity of the crankpin is greater than the first eccentricity of the disk.

59. (Withdrawn) The system of claim 57 wherein the first eccentricity of the crankshaft is smaller than the second eccentricity of the crankpin.

60. (Withdrawn) The system of claim 57 wherein the stops comprise arcuate concentrically arranged grooves in the disk in which the driver is movable, the grooves extending preferably over an angular range of up to about 180°.

61. (Withdrawn) The system of claim 55 wherein the drive shaft is operably connected to a drive gear.

62. (Withdrawn) The system of claim 55 further comprising:
a plunger pump including a pump housing and a pump chamber, the pump chamber including a pump inlet and a pump outlet;
a piston movably guided in the pump chamber and sealed against the wall of the pump chamber by a seal; and
an eccentric drive mechanism to drive the piston,

wherein the eccentric drive mechanism is operably connected to the piston through a crankpin extending in a direction transverse to the direction of movement of the piston, the piston being slidably guided in two spaced bearings of the pump housing.

63. (Withdrawn) The system of claim 62 wherein at least one of the bearings is disposed in an end area of the displacement travel of the piston in the pump housing.

64. (Withdrawn) The system of claim 62 wherein the crankpin is mounted for rotation in a sliding-block, the sliding-block being movably arranged in a direction transverse to the direction of movement of the piston along a sliding-block guideway connected to the piston.

65. (Withdrawn) The system of claim 64 wherein the sliding-block has a cylindrical cross section and the sliding-block guideway is constructed as a bore with a portion of the corresponding cross section being formed fast with the piston.

66. (Withdrawn) The system of claim 65 wherein a wall of the sliding-block guideway comprises an elongated hole for the crankpin to pass through, the elongated hole having a greater width than the diameter of the crankpin.

67. (Withdrawn) The system of claim 66 wherein the crankpin is configured to rotate along the slider in a bearing which is inserted in a bore of the slider and the piston configured to rotate about its longitudinal axis and the slider is configured to rotate about its longitudinal axis.

68. (Currently Amended) A spray nozzle for a mouth rinse, the spray nozzle comprising:
a nozzle member;
a nozzle attachment coupled to the nozzle member to define an axially extending chamber;

a liquid duct configured to supply pressurized liquid to the chamber;
a pressure piece disposed within the chamber;
a whirl chamber connected to the chamber, the whirl chamber being configured to create a circulating flow of the liquid; [[and]]

at least one a nozzle outlet formed in the nozzle attachment and extending centrally from the whirl chamber and configured to discharge a cleaning jet; the nozzle outlet comprising a substantially cylindrical narrow passage[[s]]; and
one or more spring elements that urge the pressure piece towards the nozzle outlet.

69. (Currently Amended) The spray nozzle of claim 68 wherein the nozzle outlet further comprises a conical expansion adjacent the passage[[s]].

70. (Previously Presented) The spray nozzle of claim 68 further comprising openings extending into the whirl chamber along a substantially transverse direction and with a center offset relative to the longitudinal axis of the whirl chamber, such that the liquid jet exiting from the openings impacts an opposite wall of the whirl chamber at an angle not exceeding about 45°.

71. (Previously Presented) The spray nozzle of claim 68 wherein a first end of the pressure piece comprises a cup-shaped portion having grooves extending from the chamber to openings.

72. (Currently Amended) The spray nozzle of claim [[68]]71 wherein a second end of the pressure piece, opposite the first end, comprises a second cup-shaped portion including an interior space in fluid communication with the liquid duct as well as with the chamber.

73. (Previously Presented) The spray nozzle of claim 72 wherein the interior space of the second end of the pressure piece communicates with the chamber through at least one opening which is constructed as an axial slit.

74. (Currently Amended) The spray nozzle of claim 73 A spray nozzle for a mouth rinse, the spray nozzle comprising:

a nozzle member;

a nozzle attachment coupled to the nozzle member to define an axially extending chamber;

a liquid duct configured to supply pressurized liquid to the chamber;

a pressure piece disposed within the chamber;

a whirl chamber connected to the chamber, the whirl chamber being configured to create a circulating flow of the liquid; and

a nozzle outlet formed in the nozzle attachment and extending centrally from the whirl chamber and configured to discharge a cleaning jet; the nozzle outlet comprising substantially cylindrical narrow passage,

wherein a first end of the pressure piece comprises a cup-shaped portion having grooves extending from the chamber to openings,

wherein a second end of the pressure piece, opposite the first end, comprises a second cup-shaped portion including an interior space in fluid communication with the liquid duct as well as with the chamber

wherein the interior space of the second end of the pressure piece communicates with the chamber through at least one opening which is constructed as an axial slit, and

wherein a plurality of axial slits along the second end of the pressure piece define a plurality of spring arms to axially and resiliently secure the pressure piece in the chamber.

75. (Withdrawn) A dental cleaning system, the system comprising:

the spray nozzle of claim 30; and

a brush attachment connected to the spray nozzle.

76. (Withdrawn) The dental cleaning system of claim 75 wherein the brush attachment is substantially ring-shaped.

77. (New) The spray nozzle of claim 30 wherein the one or more spring elements comprise spring arms.

78. (New) The spray nozzle of claim 35 wherein the one or more spring elements comprise spring arms that urge the pressure piece toward the nozzle plate.

79. (New) The spray nozzle of claim 30 wherein the one or more spring elements comprise a helical spring arranged coaxially with the pressure piece.

80. (New) The spray nozzle of claim 68 wherein the one or more spring elements comprise spring arms.

81. (New) The spray nozzle of claim 68 wherein the one or more spring elements comprise a helical spring arranged coaxially with the pressure piece.

82. (New) A spray nozzle for a dental cleaning system, the spray nozzle comprising:
a nozzle member;
a nozzle attachment coupled to the nozzle member to define an axially extending chamber;
a liquid duct sized and configured to supply pressurized liquid to the chamber at a pressure of at least 15 bar;
a pressure piece disposed within the chamber; and
a nozzle outlet extending out of the chamber and configured to discharge a cleaning jet.